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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
HAN, KWANG S	
ART UNIT	PAPER NUMBER
1727	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,078	SUGIE ET AL.	
	Examiner	Art Unit	
	Kwang Han	1727	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 March 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

LONG LIFE AND LOW CORROSION LEAD STORAGE BATTERY

Examiner: K. Han SN: 10/585,078 Art Unit: 1727 May 20, 2011

Detailed Action

1. The Applicant's amendment filed on March 7, 2011 was received.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "LONG LIFE AND LOW CORROSION LEAD STORAGE BATTERY WITH A SEPARATOR INCLUDING SILICA.

Claim Rejections - 35 USC § 103

4. Claim 1-6, 9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonemura (JP 2003-346888, machine translation) in view of Ohba et al. (US 5989750) and Haruno et al. (JP 08-236101, machine translation).

Regarding claim 1, Yonemura is directed towards a lead storage battery [Abstract] comprised of the following:

- a plurality of negative electrode plates (Drawing 1) each with a negative electrode grid (6), having a handle part (5, tab), and a negative electrode active material [0014] retained by the grid,
- a plurality of positive electrode plates each with a positive electrode grid, having a handle part (tab), and a positive electrode active material retained by the grid [Abstract] (Drawing 1),
- a plurality of separators (3) separating the positive electrode plate and the negative electrode plate,
- a positive electrode connecting member (10, 8) comprising a positive electrode shelf (8, positive electrode strap) to which the handle part (tabs) of each positive electrode plate of the electrode plate pack is connected (Drawing 1),
- a positive electrode connecting body (10) provided at the positive electrode shelf,
- a negative electrode connecting member (7, 9) comprising a negative electrode strap (7) to which the handle part (tab) of each negative electrode plate of the electrode plate pack is connected (Drawing 1), and
- a negative electrode connecting body (9) provided at the negative electrode strap (Drawing 1) [0010-0020],
- the positive electrode grid, the negative electrode grid, the positive electrode connective member, and the negative electrode connecting member comprise a Pb-alloy including Ca or Sn [0012-0013], and

- a negative electrode active material layer including Sb [0006-0007].

Yonemura is silent towards the separator including silica and the electrode plate pack, positive electrode shelf, and the negative electrode shelf to be immersed in an electrolyte.

Ohba teaches a lead-acid battery separator which includes an acid-resisting, oxidation-resisting inorganic filler such as silica (Column 3, Lines 9-30) for the benefit of forming a separator with high-rate discharge characteristics at low-temperature and endurance at a high temperature (Column 2, Lines 41-44). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a separator with silica inorganic filler because Ohba teaches it forms a separator which has high-rate discharge characteristics at low-temperature and in endurance at a high temperature.

Haruno teaches a lead-acid battery in which an electrode group including the lugs and ledges of the plate formed from a Pb-Sn alloy is immersed in an electrolyte to assemble the battery and provide improved corrosion resistance at high temperature by continuously forming a Pb-Sn alloy layer [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to immersed the electrode group structure formed from a Pb-Sn alloy in an electrolyte because Haruno teaches that it improves the corrosion resistance at high temperature by forming a Pb-Sn alloy layer.

Regarding claims 2 and 3, the teachings of Yonemura, Ohba, and Haruno as discussed above are herein incorporated. Ohba further teaches a separator comprising a microporous synthetic resin sheet (Column 3, Lines 9-46) with examples having 65 wt % of silica particles (Column 5, Table 1, Sample No. 1) dispersed and a fiber mat

(Column 4, Lines 35-47) with examples having 30 wt % silica (Column 5, Table 1, Samples No. 3-5) dispersed. The compositional changes within the differing samples shown in tables 1 and 3 show that the composition including variations in silica content have an effect on the oxidation resistance teaching it as a result effective variable (column 5). The courts have held that optimization of a results effective variable such as the silica content is not novel. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 4, Yonemura discloses a negative electrode active material layer including 0.001 to 0.1 weight % of Sb [0006-0007]. It has been held that where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990) (MPEP 2144.05)

Regarding claim 5, Yonemura discloses the positive electrode lattice body having a lead alloy containing tin [0012].

Regarding claim 6, the teachings of Yonemura, Ohba, and Haruno as discussed above are herein incorporated. Yonemura and Haruno are silent as to the shape of the separator.

Ohba teaches the separator to be formed in a more reliable shape for holding the electrode such as an envelope (bag) to provide a greater sense of security (Column 1, Lines 27-52; Claim 10). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a separator for a lead-acid battery with an envelope shape for the benefit of having a more reliable shape to hold the electrode. The courts

have also held that the configuration of the claimed separator was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the separator was significant. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding claims 9 and 13, Yonemura discloses a negative electrode grid skeleton comprising an expanded mesh (Drawing 1) retaining the negative electrode active material layer [Abstract], a grid bone (frame, 4) provided at an upper edge portion of the expanded mesh and handle part (tab, 5) connected to the grid bone (frame) where the ratio of the height of handle part and the width of the grid bone is 2.2 to 15.0 (Drawing 1). The variation of the height in the handle part and width of the grid bone in the electrode grid would change the shape of the grid. The courts have held that the configuration of the claimed electrode grid was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the electrode grid was significant. In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Regarding claim 11, Yonemura discloses the lead or lead alloy to include no Sb or as an impurity [Abstract, 0012, 0014].

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yonemura, Ohba et al., and Haruno et al. as applied to claim 2 above, and further in view of Doi et al. (US 4210709).

Regarding claim 7, the teachings of Yonemura, Ohba, and Haruno as discussed above are herein incorporated but all are silent as to the separator containing oil.

Doi teaches a microporous film battery separator (Column 13, Lines 39-42) formed from the combination of a polyolefin, an inorganic filler (silica, Column 7, Lines 37-47), and an organic liquid (Column 8, Lines 47-55) which is used to form a film having void spaces to provide a microporous film which has a small electrical resistance as well as high durability (Column 2, Lines 24-26). The organic liquid includes various oils such as naphthenic process oil, lubricating oils, etc. (Column 6, Lines 24-48). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a microporous film separator which is formed from a combination of polyolefin, inorganic filler such as silica, and an organic liquid because Doi teaches it forms a microporous film that can be used as a battery separator which has small electrical resistance and high durability.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yonemura, Ohba et al., and Haruno et al. as applied to claim 1 above, and further in view of Carlisle (US 3227583).

The teachings of Yonemura, Ohba, and Haruno as discussed above are herein incorporated. Yonemura, Ohba, and Haruno are silent as to the mass ratio of the negative electrode active material and the positive electrode active material.

Carlisle teaches a lead acid storage battery that is described to increase the capacity and performance capabilities of the battery by simply changing the ratio of the

active positive material and the negative active material teaching it as a result effective variable (Column 3, Line 61- Column 4, Line 17). It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the ratio of the positive and negative active materials since it has been held that discovering the optimum ranges for a result effective variable such as the ratio of the active materials involves only routine skill in the art in the absence of showing of criticality in the claimed range (MPEP 2144.05).

7. Claims 10, 12, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yonemura (JP 2003-346888, machine translation) in view of Ohba et al. (US 5989750), Haruno et al. (JP 08-236101, machine translation) and Carlisle (US 3227583).

Regarding claims 10 and 14, Yonemura is directed towards a lead storage battery [Abstract] comprised of the following:

- a plurality of negative electrode plates (Drawing 1) each with a negative electrode grid (6), having a handle part (5, tab), and a negative electrode active material [0014] retained by the grid,
- a plurality of positive electrode plates each with a positive electrode grid, having a handle part (tab), and a positive electrode active material retained by the grid [Abstract] (Drawing 1),
- a plurality of separators (3) separating the positive electrode plate and the negative electrode plate,

- a positive electrode connecting member (10, 8) comprising a positive electrode shelf (8, positive electrode strap) to which the handle part (tabs) of each positive electrode plate of the electrode plate pack is connected (Drawing 1),
- a positive electrode connecting body (10) provided at the positive electrode shelf,
- a negative electrode connecting member (7, 9) comprising a negative electrode strap (7) to which the handle part (tab) of each negative electrode plate of the electrode plate pack is connected (Drawing 1), and
- a negative electrode connecting body (9) provided at the negative electrode strap (Drawing 1) [0010-0020],
- the positive electrode grid, the negative electrode grid, the positive electrode connective member, and the negative electrode connecting member comprise a Pb-alloy including Ca or Sn [0012-0013], and
- a negative electrode active material layer including Sb [0006-0007].

Yonemura is silent towards the separator including silica and the electrode plate pack, positive electrode shelf, the negative electrode shelf to be immersed in an electrolyte, and the mass ratio of the negative electrode active material to the positive electrode active material.

Ohba teaches a lead-acid battery separator which includes an acid-resisting, oxidation-resisting inorganic filler such as silica (Column 3, Lines 9-30) for the benefit of forming a separator with high-rate discharge characteristics at low-temperature and

endurance at a high temperature (Column 2, Lines 41-44). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a separator with silica inorganic filler because Ohba teaches it forms a separator which has high-rate discharge characteristics at low-temperature and in endurance at a high temperature.

Haruno teaches a lead-acid battery in which an electrode group including the lugs and ledges of the plate formed from a Pb-Sn alloy is immersed in an electrolyte to assemble the battery and provide improved corrosion resistance at high temperature by continuously forming a Pb-Sn alloy layer [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to immersed the electrode group structure formed from a Pb-Sn alloy in an electrolyte because Haruno teaches that it improves the corrosion resistance at high temperature by forming a Pb-Sn alloy layer.

Carlisle teaches a lead acid storage battery that is described to increase the capacity and performance capabilities of the battery by simply changing the ratio of the active positive material and the negative active material teaching it as a result effective variable (Column 3, Line 61- Column 4, Line 17). It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the ratio of the positive and negative active materials since it has been held that discovering the optimum ranges for a result effective variable such as the ratio of the active materials involves only routine skill in the art in the absence of showing of criticality in the claimed range (MPEP 2144.05).

Regarding claim 12, Yonemura discloses the lead or lead alloy to include no Sb or as an impurity [Abstract, 0012, 0014].

Double Patenting

8. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In *re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

9. Claims 1-4, 6, and 10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-4 and 8 of copending Application No. 10/587186 (hereinafter referred to as Sugie '186) in view of Haruno et al. (JP 08-236101, machine translation) and Carlisle (US 3227583).

Claims 1-4 and 8 of Sugie '186 recite all the limitations of the instant claims except that of the electrode plate pack, positive electrode strap, and negative electrode strap being immersed in an electrolyte.

Haruno teaches a lead-acid battery in which an electrode group including the lugs and ledges of the plate formed from a Pb-Sn alloy is immersed in an electrolyte to

assemble the battery and provide improved corrosion resistance at high temperature by continuously forming a Pb-Sn alloy layer [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to immersed the electrode group structure formed from a Pb-Sn alloy in an electrolyte because Haruno teaches that it improves the corrosion resistance at high temperature by forming a Pb-Sn alloy layer.

Carlisle teaches a lead acid storage battery that is described to increase the capacity and performance capabilities of the battery by simply changing the ratio of the active positive material and the negative active material teaching it as a result effective variable (Column 3, Line 61- Column 4, Line 17). It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the ratio of the positive and negative active materials since it has been held that discovering the optimum ranges for a result effective variable such as the ratio of the active materials involves only routine skill in the art in the absence of showing of criticality in the claimed range (MPEP 2144.05).

This is a provisional obviousness-type double patenting rejection.

10. Claims 1 and 10 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of copending Application No. 10/587187 (hereinafter referred to as Sugie '187) in view of Ohba et al. (US 5989750), Haruno et al. (JP 08-236101, machine translation) and Carlisle (US 3227583).

Claim 1 of Sugie '187 recite all the limitations of the instant claims except that of the separator including silica and the electrode plate pack, positive electrode strap, and negative electrode strap being immersed in an electrolyte and the mass ratio

Ohba teaches a lead-acid battery separator which includes an acid-resisting, oxidation-resisting inorganic filler such as silica (Column 3, Lines 9-30) for the benefit of forming a separator with high-rate discharge characteristics at low-temperature and endurance at a high temperature (Column 2, Lines 41-44). It would have been obvious to one of ordinary skill in the art at the time of the invention to use a separator with silica inorganic filler because Ohba teaches it forms a separator which has high-rate discharge characteristics at low-temperature and in endurance at a high temperature.

Haruno teaches a lead-acid battery in which an electrode group including the lugs and ledges of the plate formed from a Pb-Sn alloy is immersed in an electrolyte to assemble the battery and provide improved corrosion resistance at high temperature by continuously forming a Pb-Sn alloy layer [Abstract]. It would have been obvious to one of ordinary skill in the art at the time of the invention to immersed the electrode group structure formed from a Pb-Sn alloy in an electrolyte because Haruno teaches that it improves the corrosion resistance at high temperature by forming a Pb-Sn alloy layer.

Carlisle teaches a lead acid storage battery that is described to increase the capacity and performance capabilities of the battery by simply changing the ratio of the active positive material and the negative active material teaching it as a result effective variable (Column 3, Line 61- Column 4, Line 17). It would have been obvious to one of ordinary skill in the art at the time of the invention to vary the ratio of the positive and

negative active materials since it has been held that discovering the optimum ranges for a result effective variable such as the ratio of the active materials involves only routine skill in the art in the absence of showing of criticality in the claimed range (MPEP 2144.05).

This is a provisional obviousness-type double patenting rejection.

Response to Arguments

11. Applicant's arguments filed March 7, 2011 have been fully considered but they are not persuasive.

Applicant's principal arguments are:

(a) Applicant fails to see how references were argued individually in previous response and no other references were mentioned in the arguments from the response filed December 1, 2009 and the office action of September 1, 2009,

(b) the usage mode of the instant applications invention is in which charge/discharge is frequently repeated at low SOC, the corrosion of the negative electrode tab is suppressed and the battery life is improved which is not disclosed in the prior art, and

(c) there is no motivation to use the separator of Ohba in the lead storage battery as taught by the combination of Yonemura and Haruno in order to suppress the corrosion of the negative electrode tab.

In response to Applicant's arguments, please consider the following comments:

(a) The responses provided by the Applicant on the response filed December 1, 2009 argues only towards the Yonemura reference's lack of a combination of the

concentration of silica combined with the concentration of Sb in showing unexpected and superior results. Applicant further asserted Table 1 of the instant application specification provides for a battery A4 (silica content 35%, Sb content of 0%) which has a composition which corresponds to the battery as taught by Yonemura to present evidence of unexpected results. Examiner's response pointed out that the composition of the Yonemura reference teachings an Sb content ranging from 0.0001 to 0.1% mass (which clearly does not correspond to Applicants asserted battery A4) which cancels the corrosion and contributes to life performance suggesting the unexpected results as asserted by the Applicant [Abstract, 0014, 0016]. Furthermore, Applicants mere statement that Haruno, Ohba and Carlisle fail to remedy the deficiency of Yonemura without presenting arguments as to why the secondary references do not have sufficient teaching, suggestion, or motivation to modify the teaching of Yonemura to make the invention obvious is an attack on the Yonemura reference individually. The rejection above shows the Ohba reference as teaching a battery separator which includes a filler such as silica provides for the benefit of high-rate discharge characteristics at low temperature and endurance at a high temperature providing sufficient teaching and motivation to modify the battery of Yonemura and make obvious a battery a claimed within independent claims 1 and 10,

(b) Arguments towards intended use such as ("under a low SOC range", "to suppress the corrosion of the negative electrode tab") do not further limit an apparatus claim. It is noted that neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim and does not provide sufficient arguments

against obviousness. Said arguments of intended use do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-

5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./
Examiner, Art Unit 1727

/Barbara L. Gilliam/
Supervisory Patent Examiner, Art Unit 1727